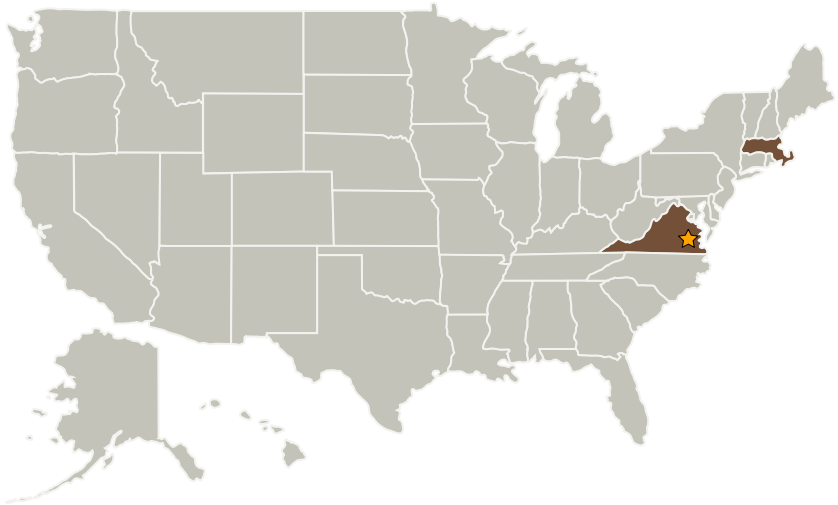
Long Duration Space Shelter Shielding, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

Physical Sciences Inc. (PSI) has developed fiber reinforced ceramic composites for radiation shielding that can be used for external walls in long duration manned space shelters. The wall system comprises a high strength, hollow core composite that can be filled with materials to perform other critical operations such as thermal management. The composite technology enables a modular wall shielding system that exhibits superior radiation resistance to galactic cosmic radiation (GCR), solar particle emission (SPE) and secondary radiation sources produced by the interaction of the primary source with the lunar regolith and shield materials. This Phase I SBIR will develop and demonstrate radiation shielding composite wall architecture that -- 1) Can replace aluminum in lunar shelter structural applications. 2) Can act as a ballistic shield enclosing a multifunctional cavity. 3) Can serve as a multifunctional platform for additional shelter functions such as thermal management. We will design and fabricate as well as strength and radiation resistance test prototype multifunctional composite structures. We will demonstrate that the composite system components have superior mechanical properties to and at least 20% greater radiation shielding effectiveness than an aluminum structure of comparable areal density.

Primary U.S. Work Locations and Key Partners



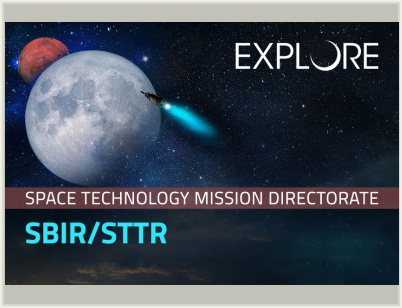


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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Physical Sciences, Inc.	Supporting Organization	Industry	Andover, Massachusetts

Primary U.S. Work Locations	
Massachusetts	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

John Steinbeck

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.1 Lightweight Structural Materials